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RECENT DEVELOPMENTS IN CANADA'S UNIVERSITY
TUBERCULOSIS SERVICES OF MICHIGAN

G. J. Wherrett

✓ APR 14 1955

POLIOMYELITIS FIELD TRIAL IN MANITOBA MEDICAL
LIBRARY

C. C. Wright

TRENDS IN MEDICAL CARE ADMINISTRATION

G. H. Hatcher

**AN OBJECTIVE APPROACH TO THE PROBLEM
OF STREAM POLLUTION**

L. A. Kay

POPULATION IN BRITAIN


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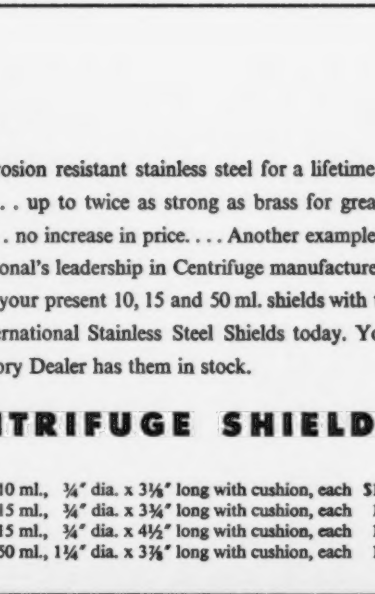


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Canadian Journal of **PUBLIC HEALTH**

VOLUME 46

TORONTO, MARCH 1955

NUMBER 3

Recent Developments in Canada's Tuberculosis Services

G. J. WHERRETT, M.D., M.R.C.P., F.R.C.P. (C)

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Canadian Tuberculosis Association
Ottawa, Ontario*

SINCE September 1939 Canada's tuberculosis program has undergone a profound change and facilities for the diagnosis and treatment of the disease have greatly improved. Funds have been available on an unprecedented scale to individuals, organizations and government agencies of all levels. Where every measure of advance was previously looked at from the standpoint of finance, if any measure could be shown to have a bearing on health and well-being of the people, it has become available for use.

While we are inclined to give the credit for the dramatic fall in death rate in large measure to the newer drugs and surgical measures available for the treatment of tuberculosis since 1948, it is not always realized that these could not have been used to the same extent had not all phases of the program been brought up to date.

The basic principles of tuberculosis control have changed very little, but the application of these principles has undergone a tremendous development. In Canada, the major share of the burden of the tuberculosis program is carried by the ten provinces. With the advent of the national health program of 1948, for the first time in our history the Federal Government assumed a major role in providing funds for newer advances. This paper will attempt to outline some of these developments, made by the provinces and greatly assisted by the Federal Government's program of 1948.

Federal participation in health matters, on the scale undertaken in the health grants' program, is a major step in Canada. Under the terms of the British North America Act, health became the responsibility of the provinces,

and federal authorities seemed unwilling to assume any assistance beyond previous commitments in the medical care of war pensioners, Indians and Eskimos. The health grants' program, however, places the Federal Government squarely in the field for assistance in the care and prevention of a number of diseases, including tuberculosis.

Lest it might be thought that all the advances have been made possible with Federal funds, it may be well to consider the increased expenditures that have been made by the provinces. Some of the increase is due to the increased costs of all services between 1939, before the war's inflation had started, and the still rising costs of 1954. As an example, the cost of operating provincial sanatoria of all kinds in 1939 was \$6,882,443, while in 1953—fourteen years later—the cost was \$33,542,984. The number of treatment beds had, however, increased from 10,160 to 18,500.

The cost of increasing treatment facilities fell very largely on provincial governments. While there was a construction grant, as part of the Federal Grants' program of 1948, providing \$1,500 per bed for new construction, this represented only a small portion of the cost, as costs per bed had risen to figures as high as \$12,000 per bed. An example of the outlay made by provinces to bring their treatment facilities up to the required quota is to be found in Quebec, where \$10,000,000 was voted in 1946 for sanatorium construction. The contributions of the province for construction and expansion of sanatoria reached a total of \$16,000,000 by April 1948. Newfoundland, Ontario, Alberta and British Columbia also built and equipped new sanatoria with the assistance of the Federal Grants, and New Brunswick and Nova Scotia made use of defence hospitals.

Full credit also must be given to the voluntary associations, both provincial and local. At the beginning of the century, they were the only agencies taking part in the campaign. Now, they are proud to be the partners of the official agencies in these advances.

Although the major share of the costs now falls upon provincial governments by way of per diem grants, many of the services are still under voluntary direction. In addition, their threefold program of early diagnosis, education and rehabilitation is carrying the battle into areas not fully covered otherwise.

The confidence of the public in these services is seen in the significant increase in the funds available for this purpose from the Christmas seal campaign. It has increased more than tenfold from \$195,677 in 1939 to just over \$2,000,000 in 1954.

In addition to the Federal Grants' program, it is to be noted that the Federal Government has participated in the accelerated tuberculosis control program on a greater scale than previously undertaken. It has continued to treat all tuberculous veterans whose disease was considered to be the result of, or was incurred on, service. While the greater number are treated in provincial sanatoria on the basis of payment for services rendered, the Department of Veterans Affairs has also maintained tuberculosis hospitals where provincial services were insufficient to take care of the need. The greatest responsibility, however, is in the program for tuberculosis control for Indians and Eskimos. Whereas, only 300 Indian patients were treated in 1939, the Department

admitted 3,883 patients to sanatoria and hospitals in 1953, out of a population of 156,945. While half of these were in provincial sanatoria, the remainder were in hospitals built by the Department of National Health and Welfare, or in defence hospitals taken over at the end of the war for the treatment of tuberculosis in Indians and Eskimos.

It is on this program that the Federal Health Grants have rendered further extension possible. The wide field covered by these grants is shown in the following tables. Table I sets out the amounts available and the amounts expended by the provinces for the fiscal years 1948-49 to 1952-53 inclusive. From April 1951, the regulations permit any unused portion of one grant in a province to be transferred to another grant, hence the percentage may exceed 100, as in the case of Quebec.

TABLE I

FEDERAL TUBERCULOSIS CONTROL GRANT

Amounts Available, Expenditures and Percentages of Amounts Available Expended by Provinces, Fiscal Years 1948-49 to 1952-53 inclusive

	Amount Available	Expenditures	Percentage Expended
Canada	\$18,772,000	\$16,306,000	86.9
Newfoundland	824,000	681,000	82.6
Prince Edward Island	261,000	211,000	80.5
Nova Scotia	1,038,000	1,034,000	99.6
New Brunswick	847,000	770,000	90.9
Quebec	6,469,000	6,652,000	102.8
Ontario	4,515,000	3,186,000	70.6
Manitoba	1,108,000	642,000	57.9
Saskatchewan	1,030,000	928,000	90.1
Alberta	1,117,000	917,000	82.1
British Columbia	1,550,000	1,279,000	83.8

The services for which these grants were spent are set out in Table II. This covers a wide range. In approving of these grants, the Department of National Health and Welfare has used a broad interpretation of the principles outlined by the Order-in-Council under which the program operates. New services and extension of existing ones are the main purposes for which the grants were made available.

A study of Table II indicates that sanatoria received the largest proportion of the grant, 41.3%. This was used for equipment, salaries of sanatorium personnel and rehabilitation services. In several instances maintenance of patients in new institutions was allowed. Later it was changed to provide only a proportion of the cost. This was to insure that 25% of the grant be available for new projects. This assistance to institutions has been very useful in bringing all institutions up to modern standards in the matter of equipment, staff and consultant services.

The next largest item is that of Diagnosis and Case-Finding Services, 36.5%. This has provided staff and equipment for regular and travelling clinics, mass surveys and hospital admission x-ray programs. It is only necessary to study the sharp increase in these services to appreciate how this was accelerated by the Federal grants.

TABLE II

FEDERAL TUBERCULOSIS CONTROL GRANT: EXPENDITURE BY TYPE OF PROGRAM AS A PERCENTAGE OF TOTAL EXPENDITURE, FISCAL YEARS 1948-49 TO 1952-53

	CANADA	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
<i>Program</i>	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Sanatoria	41.3	57.8 ²	29.7 ²	64.9 ²	53.0 ²	45.3 ²	16.7 ²	30.1 ²	28.4 ²	80.3 ²	35.3 ²
Drugs	13.6	18.8	14.0	17.9	11.7	9.9	22.3	13.5	11.4	7.5	12.7
Training of Personnel ³	3.9	2.7	1.5	—	0.7	7.2	0.4	1.2	0.9	2.3	5.1
Diagnosis and Case Finding Services	36.5	15.7	54.8	17.2	34.5	30.2	55.0	55.0	54.1	9.9	46.5
BCG Vaccination Programs	2.7	5.0	—	—	.1	5.5	—	0.2	3.6	—	—
Research	2.0	—	—	—	—	1.9	5.6	—	1.6	—	0.4
Total Expenditure	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

(1) Total Percent expended.

²Includes: Equipment, salaries of sanatoria personnel, rehabilitation services, maintenance sanatoria patients.³Includes: Equipment, salaries, rehabilitation.⁴Includes: Equipment, salaries.⁵Includes: Physicians, nurses, technicians.

The third largest item is that of drugs. This has included streptomycin, PAS and isoniazid. The grants program was instituted just after the first drugs came on the market. It was a time when the cost of these drugs (and at the time it was considerable) was not provided out of other provincial grants. Many patients were obliged to pay for such antibiotics as were in use. The Federal grant made possible the use of the drugs on as wide a scale as medical advice suggested. The dramatic fall in deaths demonstrates the value of this step.

Training of personnel accounted for 3.9% of the grant. It provided training for physicians, nurses and technicians for short or long-term courses.

The two items for which the smallest percentage was allotted were BCG vaccination and research, 2.7% and 2% respectively. It must be noted, however, that in the provinces of Newfoundland, Quebec and Saskatchewan, the percentage spent on the BCG program was 5%, 5.5% and 3.6% respectively. The percentage spent on research is small and does not include other funds spent from a research grant not provided out of the Tuberculosis Grant.

Case-Finding Services

The main pivot of the case-finding program is the *Tuberculosis Clinic and Dispensary*. To these are sent suspects from the general practitioners; contacts; families who are supervised and examined; and usually the final diagnosis is made on those who are recalled from mass surveys and the hospital admission program. The volume of work at these clinics has grown steadily over the years.

The number of x-rays taken has increased from 314,618 in 1944 to 611,523 in 1953.

Mass surveys were first undertaken in Canada in 1941 by the Saskatchewan Anti-Tuberculosis League. These have increased greatly and are carried out in every province. The number examined has increased from 439,610 in 1944 to 2,214,721 in 1954. These were first introduced by voluntary associations, but the Federal funds now provide the greater part of this undertaking. This, on the basis of a population of fifteen million, is approximately one in seven of the total.

Hospital Admission X-Rays. The routine x-ray of general hospital admissions is the latest major case-finding project. It is proving to be of more value than the community surveys as a case-finding procedure. The yield of cases is greater and it is proving to be a valuable aid to the practising physician in the diagnosis, not only of tuberculosis, but also of other thoracic diseases. It is developing rapidly from 306,347 in 1950 to 560,359 in 1953.

Table III is a summary of the x-ray examinations carried out under the three main case-finding activities from 1944 to 1953.

TABLE III
CASE-FINDING ACTIVITIES IN CANADA—1944 TO 1953

Year	Clinics	Mass Surveys	Hospital Admissions	Total
1944	314,618	439,610		754,228
1945	432,767	526,413		959,180
1946	444,739	917,482		1,362,221
1947	538,033	1,292,306		1,830,329
1948	522,882	1,613,496		2,136,378
1949	545,904	1,745,546		2,291,450
1950	514,579	1,888,145	306,347	2,709,071
1951	542,112	2,039,064	439,192	3,020,368
1952	582,371	1,932,700	489,824	3,004,895
1953	611,523	2,214,721	560,359	3,386,603

Fall in Death Rates

The progressive fall in death rates, which has been so evident in Canada throughout the century, has been accelerated since 1948. It fell 54% from 81.7 per 100,000 in 1928 to 37.1 in 1948, twenty years later. In the next five years it was to fall 66% to an astonishing figure of 12.3 in 1953. This fall coincided with the wider use of antibiotics which were made available readily to the provinces under the Health Grants program.

In sharp contrast, however, there has not been the same decline in notifications or in the number of cases admitted to hospitals and sanatoriums. Table V

TABLE IV
DEATH RATE PER 100,000 POPULATION FROM TUBERCULOSIS—CANADA

1928 — 81.7
1938 — 54.7
1948 — 37.1
1953 — 12.3

TABLE V
TUBERCULOSIS DEATHS AND NOTIFICATIONS 1942 TO 1953—CANADA

Year	Deaths	Notifications	Ratio
1942	5,980	12,015	1-2.0
1943	6,168	12,520	1-2.0
1944	5,724	15,292	1-2.6
1945	5,546	14,328	1-2.5
1946	5,821	15,263	1-2.6
1947	5,449	13,739	1-2.5
1948	4,773	12,363	1-2.5
1949	4,295	13,097	1-3.0
1950	3,583	12,429	1-3.4
1951	3,417	11,152	1-3.2
1952	2,457	10,506	1-4.2
1953	1,810	10,545	1-5.8

shows the number of deaths and notifications in each year from 1942 to 1953; also the ratio of deaths to notifications. The rate has gone up from 1 to 2 and now stands at 1 to 5.8.

Admissions to Hospitals and Sanatoria

The general trend has been upward, both for new admissions and readmissions. Waiting lists have been present for many years but have disappeared in 1953 except for certain geographical areas. There would be none if distances could be eliminated as there are some empty beds in certain provinces. There has been an increase in the percentage of readmissions, as will be seen from Table VI.

TABLE VI
ADMISSIONS TO SANATORIA IN CANADA 1944 TO 1953

Year	New Admissions	Re-admissions	Total	Re-admissions to Total Per Cent
1944	8,597	2,301	10,898	21.1
1945	9,293	2,474	11,764	21.0
1946	10,416	3,441	13,857	24.8
1947	9,518	3,627	13,145	27.6
1948	9,541	4,231	13,772	30.6
1949	10,146	4,272	14,418	29.6
1950	10,466	4,584	15,050	30.5
1951	10,346	4,553	14,899	30.5
1952	10,032	4,315	14,347	30.0
1953	11,134	4,379	15,513	28.2

As this paper is being written, preliminary reports for the first nine months of 1954 indicate that the year will see a decline in notifications, first admissions and readmissions to sanatoria. Empty beds have appeared in some institutions in at least nine of the ten provinces. It seems evident that this is the beginning of a decline in morbidity which may now parallel that of mortality.

Length of Treatment

Elsewhere we are told that newer drugs and chest surgery have reduced the length of treatment. Although drugs are used on a large scale and pul-

monary resections are increasing steadily, there has as yet been no reduction in the average length of stay in sanatoria. Table VII shows the length of treatment for the years 1942, 1947, 1952 and 1953. It will be seen that only in the cases of non-pulmonary lesions has there been a progressive fall in the length of treatment. In all other instances treatment is longer. It is no doubt influenced by the fact that those who formerly died after a comparatively short period of treatment now recover, although the stay in sanatorium is prolonged.

TABLE VII
LENGTH OF STAY IN SANATORIA—1942, 1947, 1952 AND 1953—CANADA

	1942	1947	1952	1953
All Tuberculous	318.1	297.6	342.1	364.6
Primary	292.9	369.5	392.6	427.1
Minimal	219.8	248.2	275.6	280.5
Moderately Advanced	314.8	294.7	345.1	354.4
Far Advanced	381.5	345.8	424.6	476.5
Pleurisy with Effusion	187.9	231.7	222.4	212.0
Non-Pulmonary	319.1	275.6	264.2	280.2

It would appear that we have the weapons to completely control tuberculosis, provided that we apply them fully and effectively. It would appear also that case-finding, even though it is becoming more and more costly, should be pushed with all the efforts of which we are capable.

Federal participation has come at a time when such help could be more effective. With such assistance, the case-finding program has been extended greatly and treatment services have been brought up to the peak of efficiency. The newer drugs have been made available on a wide scale and facilities for chest surgery extended. There is no doubt the Federal grants have played a great part in the results obtained.

Our immediate task is clear. It is to press forward with all the facilities now available, paying particular attention to early diagnosis and following persistently all the epidemiological trails along which the disease may lead us. We must not mistake even a major advance for final victory, but must be determined that our efforts shall be unremitting until the victory now in sight is actually achieved.

REFERENCES

1. Dominion Bureau of Statistics. Annual Reports of Tuberculosis Institutions 1939 to 1953.
2. Department of National Health and Welfare Ottawa. Information supplied by Health Insurance Studies Directorate.
3. Canadian Tuberculosis Association Ottawa. Annual Reports 1944 to 1953.
4. Dominion Bureau of Statistics. Vital Statistics Reports.

Poliomyelitis Field Trial in Manitoba

C. C. WRIGHT, M.B., Ch.B., D.P.H.

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Winnipeg, Manitoba

IN the first week of June, 1954, a telegram from the Department of National Health and Welfare, Ottawa, was received by the Honorable F. C. Bell, Minister of Health and Public Welfare, Province of Manitoba. With the other provinces of Canada, Manitoba was invited to participate in the great field trial of the poliomyelitis vaccine, developed by Dr. Jonas E. Salk, Research Professor of Bacteriology at the University of Pittsburgh.

The trial was already under way in forty-four of the United States, and this offer to Canada to take part in this, the greatest medical research project in history, was occasioned by the fact that a surplus of materials existed after the needs of the American States had been met. In the United States much planning had preceded the launching of the trial; liaison had been instituted between the National Foundation for Infantile Paralysis and the Association of State and Territorial Health Officers during the latter part of 1953. By November, 1953, committees of the association, elected to advise the National Foundation, were engaged in formulating a plan of operation of the trial, after being satisfied that the material was ready for field trial. During December 1953, meetings at the regional and local levels arranged by the Regional Medical Consultants of the National Foundation, were attended by state and territorial health officers, accompanied by representatives of state medical societies, education groups and voluntary organizations. Early in March, 1954, a comprehensive, 58 page manual of suggested procedures for the conduct of the vaccine field trial in 1954, and numerous operational memoranda were issued by the National Foundation. The preparatory phase, therefore, in itself was a great undertaking, aimed at organizing the trial to the very last detail, so that the workers at every level would be thoroughly conversant with their role in the project, and so make it possible for the vaccination program to be completed, according to a rather tight time-table.

On receipt of the invitation to Manitoba to participate in the trial, the Honorable F. C. Bell sought the advice of his Deputy, Dr. M. R. Elliott, senior staff members of the Department of Health, the Poliomyelitis Advisory Committee, and representatives of the Manitoba Medical Association and of the Winnipeg Medical Society. Dr. Pothoff of the National Foundation flew to Winnipeg, at the request of the Minister, for consultation with the Minister's Medical Advisers, and, after much deliberation, the Minister was advised that the invitation to participate in the field trial should be accepted by the Province of Manitoba.

It was realized that the difficulties in operation of the trial would be great

for the following reasons: (a) The preparatory phase, of necessity, would have to be shrunk to about one week, as opposed to the period of months, which had been available in the United States. (b) The fact that the first doses could not be given before the third week of June meant that only the first two doses would be given before the schools closed for the vacation, necessitating the return of the pupils for the third doses during the fourth week of July. In many cases the children would be away from their local areas, and many might default from the third dose. (c) The children still would be on vacation when the second blood sample collection took place in the first or second week of August.

Despite the difficulties which would be encountered, however, the Minister's advisers considered that, in view of the severity of the epidemics which had beset the Province in 1952 and 1953, the people of Manitoba would wish to play their part in this great project. So advised, the Minister, on behalf of the Province, accepted the invitation to participate in the field trial.

General Scope of the Field Trial

In the trial two types of statistical control groups have been employed—Observed Control and Placebo Control. The Observed Control Groups are operating in 126 field trial areas in the United States, having a total Grades I-III enrollment of 1,050,000 children. In these areas all the children in Grade II were offered the vaccine. About 50% of these Grade II children received parental consent, and 222,232 children completed the three doses of vaccine. The children in Grades I and III, numbering between five and six hundred thousand, are serving as the observed control groups.

DATA ON STUDY POPULATION, MANITOBA—GRADES I, II AND III

Type of Statistical Control	Placebo Control
Number of Field Trial areas	17
Number of schools participating	57
Grades I, II and III enrollment	11,081
Number of parental consents	7,031
Percentage consents/enrollment	63%
Number of doses at first session	6,737
Number of doses at second session	6,529
Number of doses at third session	5,851
Total number of doses	19,117
Number of vaccinated children with 3 doses	5,815 (86.3%)
Number of vaccinated children with 2 doses	745 (11.0%)
Number of vaccinated children with 1 dose	182 (2.7%)
Number of children with no doses	4,339 (39.2% of study population)
Number of bleedings at first collection (before vaccination)	264
Number of bleedings at second collection (2 weeks after third injection session)	168
Number of bleedings at third collection (4 months after third injection session)	227
Total number of bleedings	659
Total number of children giving blood samples	264
Number of children providing 3 blood samples	150 (57%)
Number of children providing 2 blood samples	95 (36%)
Number of children giving 1 blood sample	19 (7%)

The second type of control group, the placebo control, is being used in 91 areas of the United States, with a total Grades I-III enrollment of 750,000, and in three of the Provinces of Canada as follows: Manitoba, 17 areas with Grades I-III enrollment of 11,081; Nova Scotia, City of Halifax, with 5,559 children; Alberta, 28 areas with 37,406 children, scattered throughout the province and including the cities of Edmonton and Calgary.

In all these areas the children, in Grades I, II, and III, who had received parental consent, were inoculated. Only half of them however, received the vaccine, the other half getting a placebo.

The trial was conducted in 217 areas in 44 of the United States and in 46 areas in three Provinces of Canada. The American study population consists of approximately 1,800,000 children in Grades I-III, and the Canadian of 54,000. About 680,000 children received inoculations, approximately 450,000 getting the vaccine. In the placebo control group, only the director of the field trial at the University of Michigan knows which groups of children received the vaccine, and which groups received the placebo. The dose of injection was 1 c.c. given intramuscularly (Triceps) followed by a similar dosage at intervals of 1 and 5 weeks from the first injection. Over 40,000 blood samples were collected before any injections were given, and more than 32,000 samples were collected two weeks after completion of the inoculation program. During the first two weeks of November, third bleedings were performed, but figures of the number of samples obtained are not yet available.

The Field Trial in Manitoba

In any operation such as this, success depends on the quality of the planning done in the preparatory phase. If a project is to be on a great scale, the time available for organization becomes all-important. As time was limited the field trial in Manitoba had to be restricted to areas, having a good liaison and lines of communication with the provincial department of health in Winnipeg. Accordingly sixteen areas, served by thirteen local health units, were selected as field trial areas, and a seventeenth, the village of Winkler, was included at the special request of the local doctors, on account of the severe epidemic, which occurred in Winkler during 1952.

Such a choice of areas met the requirements of good liaison and lines of communication, but, in addition, it meant that trained staffs of doctors and nurses, specially experienced in conducting immunization programs, would be implementing the plan of operation. Much of the work of local health unit doctors and nurses is done in schools, and the existing, good liaison and cooperation with the teachers and the Department of Education, facilitated the preparatory phase of the trial in these areas.

Schools having a sufficient number of Grades I-III pupils, were selected in each area. The necessary forms, "parental request", class registration and individual vaccination records, were supplied by the National Foundation for Infantile Paralysis. Only a few days were available for the distribution of these forms to widely-scattered areas in the province, as far north as Flin Flon, west to Virden, and south to Winkler. Parental request forms had to be com-

pleted for each child in Grades I-III, and sent home with the child for the parent's signature, if the parent wished the child to participate in the trial. When these forms were returned to school, the class registration forms and individual vaccination records had to be made ready for use on the days of vaccination of the scholars.

The facilities of the press and radio in Winnipeg and other parts of the Province were provided generously for the dissemination to the general public of the news of the trial, including its object, and the dates and venues of vaccination clinics.

In addition to the literature and forms, the National Foundation for Infantile Paralysis also provided the material for vaccination, syringes, needles, blood sample containers and other materials required for the trial. These were flown to Winnipeg from different points in the United States, and, after clearance through Customs, were distributed to the field areas by various agencies, such as plane, bus and automobile.

Field Trial Areas

The sixteen areas served by health units consisted of the cities of St. Boniface, Brandon and Portage la Prairie, the towns of Flin Flon, Dauphin, Selkirk, Neepawa, Swan River, Steinbach, Virden and Stonewall, and the urban municipalities of Fort Garry, St. James, St. Vital, West Kildonan and East Kildonan. The seventeenth area was the village of Winkler.

The city of Winnipeg, which has its own Department of Health, decided not to participate in the field trial.

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COMING MEETINGS

British Columbia Branch, Canadian Public Health Association: Art Gallery, Vancouver, B.C., April 12.

Saskatchewan Branch, Canadian Public Health Association: Central Collegiate, Regina, Sask., April 12 and 13.

Trends in Medical Care Administration

II. GOVERNMENT HOSPITALIZATION INSURANCE IN CANADA

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ATTENTION has been directed previously (1) (2) to the increasing organization of health services and medical treatment programs under various auspices. In this rapidly developing pattern of medical and hospital service organization in Canada a number of trends may already be discerned.

The first of these is the increasing concern of government as the principal public agency taking responsibility for overall planning, if not actual provision, of medical and health services. The Canadian provincial health departments in particular have long been characterized by their high degree of integration of public responsibility for most medical and health services within the province. Franz Goldmann in a recent article has indicated seven special health fields in which some public policy has developed historically in the United States, and in large measure these are equally relevant to Canada (3).

With respect to hospital care, we have had within provincial health departments for many years responsibilities for: (i) most of the financing, and in many provinces the actual operation, of mental and tuberculosis hospitals; (ii) the licensing and payment of maintenance grants to all public general hospitals within the province. The public general hospitals have usually been owned and operated by voluntary boards in eastern Canada and British Columbia, and by local governments predominantly in the mid-west, with a few provincially owned and operated hospitals, principally in Newfoundland.

The provincial responsibility for maintenance costs of public general hospitals has its roots in both the English Poor Law tradition and the pioneering background of this country. Thus the provincial grants were usually related in some way to the number of public ward beds or other provision for the indigent, although in some provinces lump-sum grants are made. In addition provincial law has usually required the municipality of residence of a person deemed indigent with respect to hospital care to pay a specified amount to the public general hospital.

In many smaller communities only one general hospital could be supported, so, regardless of its ownership, the tradition was soon established that it was

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a community hospital, available to the general public, subject to public regulation and entitled to public funds.

During the five years from 1947 to 1951 a second trend in the organization of medical care services in Canada became obvious. This was the organization of, or extension of provincial responsibility for, government hospitalization insurance plans in four Canadian provinces. In 1947, after a six months' trial in one region, the Saskatchewan Hospital Services Plan was inaugurated. In 1949 the Province of British Columbia adopted a very similar program. In the same year Newfoundland joined Canada as its tenth province, bringing with it a provincial health department in which a hospital and medical care insurance plan now covering about 40% of the population has been operating since 1934. In 1951 an amendment to the Alberta Hospitals Act extended the Alberta municipal hospitalization insurance plans to non-ratepayers on a voluntary basis.

These plans had been operating in the rural mid-west since the first world war. In 1950 the Alberta government moved to extend them to the urban population, and in 1951 a provincial government subsidy was offered of 50% for non-ratepayers within any Alberta municipality who desired to enrol in their local government hospitalization plan. Thus four of the ten Canadian provinces now have a substantial measure of government hospitalization insurance.

There are doubtless many diverse reasons prompting these developments in four different provinces. Perhaps two may be suggested as common to all and both reasons are fundamentally economic. First is the need for increased provincial financial assistance to meet hospital costs and enable local hospital boards to balance their budgets. Government hospitalization insurance is a logical extension of financial responsibility from a local to a provincial level which is evident in other areas of public administration today. It is also a logical extension of the long-established tradition of provincial maintenance grants to public general hospitals. When these grants increased sufficiently during and after the war to become a major item of public expenditure it seemed logical in some provinces to establish a hospitalization insurance plan at the same time as grants were increased.

This is related to the second reason for this trend to government hospitalization insurance: namely, the impact on family finances of the costs of hospital care. The principle of spreading the risk and pooling the cost of such contingencies through insurance or taxation is well established in other fields. Its extension to medical and hospital care has been shown to be feasible in a number of voluntary and public programs in Canada and abroad. A hospitalization insurance plan also offered the possibility of an added source of revenue for provincial governments—who are constitutionally limited to direct taxation—when faced with the need for additional expenditures for hospital services.

Before attempting to draw conclusions from the rather brief Canadian experience of this type of program let us review quickly some of the principal features of each of these four plans.

The Newfoundland Cottage Hospital Program

The relatively undeveloped state of local government in Newfoundland, the small population, and its sparse distribution have obliged the province to assume many of the responsibilities that would be shouldered by local governments or voluntary agencies in other provinces. Thus, commencing in 1934 a system of 18 cottage hospitals and 6 nursing stations, based on a 450-bed general hospital, have been built and staffed by the provincial government. These are in addition to two sanatoria and one mental hospital operated by the province. There are also five voluntary hospitals in Newfoundland, most of which receive some financial assistance from the provincial Health Department.

At the last census two-thirds of the population of Newfoundland lived in communities of 1,000 persons or less, scattered over the 7,000-odd miles of coastline. The small cottage hospitals and nursing stations built and operated by the government have for the first time made modern medical and hospital care available to the population of Newfoundland's "outports." Nurses of the provincial Department of Health staff the hospitals. Physicians in the employ of the Department provide domiciliary, out-patient and in-hospital medical services for the approximately 150,000 living in the cottage hospital districts.

Eligibility for care in theory is dependent on prior payment of a family premium of \$15 per year. In parts of three economically better areas the annual premium amounts to \$24 to \$36 per family per year. Single persons pay half this rate and a lesser rate is charged in the nursing service areas at the periphery of the cottage hospital districts. Additional charges may be made for private rooms, maternity care, dental extractions and out-patient drugs and appliances at modest rates specified by the Department. The principal deterrent to service is still economic in the form of transportation to the hospital, doctor or nurse, which must be paid by the patient. Revenues *from the fees attributable to hospitalization* meet about *one-quarter* of estimated expenditures for hospital care in the cottage hospitals and for cases referred to the St. Johns General from these districts.

The indigent are included under this program. The method of payment of the local physicians takes into account the indigent load, and even those in receipt of relief allowances are expected to pay part of the cottage hospital subscription fees. Although the program is compulsory, failure to pay the premium in advance does not necessarily disqualify a family from receiving care under the program. Rather, a sort of fine in the form of a double premium may be levied if the patient seeks care and has not paid his subscription three or more months after the beginning of the hospital year. The local secretary-treasurer of the cottage hospital district usually collects the fees.

Hospitalization benefits include complete public ward care and all extras subject to the availability of facilities* and to the discretion of the attending physician. After being referred by the local physician, the patient is eligible for public ward care in the St. Johns General Hospital, which is the base hospital for this program.

*About 3 beds per thousand covered population plus beds in St Johns General for referred cases.

The benefits of this program are unique both in the provision of physicians' services (which will be discussed in a later paper) and in the fact that the local physician is usually the only practitioner available in these isolated areas.

All activities of the Provincial Health Department cost nearly \$6 million a year. It is impossible to separate accurately the costs of administration of the hospital insurance program from administrative costs of the Department of Health as a whole, or from the costs of local physicians' services (which include public health and preventive medical services), nor yet from the costs of local hospital administration. The principal virtues of this program—viz. the high degree of integration of all medical and health services—are also the principal reasons for this difficulty in obtaining comparable financial statistics and estimates of administrative cost. It should be noted, however, that estimated per diem costs of hospital care in these institutions are relatively low in comparison with the rest of Canada,* utilization is necessarily limited by the low bed-population ratio, and that at least two brief surveys of the organization of the Department of Health have suggested the need for more rather than fewer administrative personnel.

The Saskatchewan Hospital Services Plan

This is undoubtedly the best documented (5) of any medical care program in Canada, yet it is surprising how many Canadians mistakenly believe that Saskatchewan has a system of "socialized medicine". Saskatchewan has many interesting medical care programs, including those for the indigent, for cancer, the municipal doctors, and the Swift Current insurance plan for physicians' services. However, the only province-wide medical care program covering virtually all the population and all diseases is a compulsory hospitalization insurance program, which is very similar to a Blue Cross plan, extended to cover everyone and all illness, and operated on a compulsory basis by the provincial Department of Health. The hospitals remain under their original ownership and management, physicians practise medicine as before—except that they are able to hospitalize their patients more readily—and the program appears to have almost complete support from all political parties, hospitals, physicians, and the general public.

The Saskatchewan Hospital Services Plan comes as close to a comprehensive hospital care program, both with respect to coverage and benefits, as we have anywhere in Canada. The only persons excluded from coverage are those for whom some other agency is already responsible, such as workmen's compensation cases, armed services personnel, and Indians, and also those who have not been insured through failure to pay the premium in advance. Thus this is definitely an insurance program, with eligibility for benefit dependent on prior payment of a premium. Most of the indigent are covered by the Provincial Government, with a small number remaining under the responsibility of municipalities of residence, which pay either the premium in advance, or the hospital bill if they are delinquent in paying the tax. This leaves a small group, unknown to the province or municipality as indigent, who fail to pay their premiums and who would turn out to be unable to pay

*\$7.78 per diem was 1951 average.

their hospital bills if hospitalized. Estimates vary but in the present good times this group may amount to 2% to 3% of the total covered population.

The only limitations on benefits are a few of the latest drugs, multiple vitamin preparations, blood for transfusions, and conditions for which in-hospital care is obviously not required, such as a radiograph for a sprained ankle. Public ward care is provided and if the patient chooses private accommodation, he pays the difference in cost. Benefits are much more limited in hospitals outside the province, consisting of \$7.50 per hospital day up to sixty days per year. There is almost no limit on the duration of hospital care provided so that chronic illness is definitely included in this program.

Over 200 admissions and over 2,100 patient days of care per thousand beneficiaries were provided last year. This is substantially in excess of the rates in provinces which do not have a universal comprehensive hospitalization insurance plan; for example, hospitals in Ontario in 1952 had about 150 admissions and gave about 1,600 patient days of care per thousand persons.* On the other hand, Saskatchewan has also the greatest number of hospital beds per thousand people of any province in Canada: approximately 7 in addition to mental and tuberculosis hospital beds.

Methods of limiting the volume of hospitalization to what is really necessary have been described in the annual reports of the Plan and in papers by Roth, Myers, and others (6). At present it appears that part of this excess is related to the care of the chronically ill and to the rural nature of the province with its dispersed population. Thus the approximately 1½% of all cases who stay in hospital over 60 days account for about 18½% of all patient days of care. Another interesting development has been the levelling out of hospital utilization and related costs when a new method of payment was introduced in 1951. This method has been described in the references previously cited and encourages optimum rather than excessive care. However, it is interesting to note that the stabilization of utilization began even before the new method of payment and was closely related to a decline in the provision of additional hospital beds. A stricter policy relative to care for long-stay patients no longer needing the facilities of a general hospital is also said to have had an influence last year in this levelling out of utilization.

Costs under the program amount to approximately \$16 million a year or over \$19 per capita. Of this about 50% comes from the hospitalization tax and the balance from general revenues of the province. The maximum hospitalization tax amounts to \$40 a family and the average payment to hospitals per patient day is about \$9.

The low administrative expense and the high administrative efficiency of the Saskatchewan Plan are outstanding features. In every year since its inception the Plan has employed fewer personnel and the percentage of total costs diverted from hospital payments to administration has likewise been reduced from 7.9% to 3.7%. This includes the commission paid to the municipality of residence for collecting the hospitalization tax, but the cost of collecting the other general taxes of the province which provide the balance of the revenue of the Plan is not included in these figures.

*All admissions, general, chronic, convalescent and Red Cross outpost hospitals (7).

As in Newfoundland, administration of hospitalization insurance in Saskatchewan is a direct line responsibility of the provincial health department. Unlike Newfoundland, at the local level hospital administration is quite separate from public health administration and from the provision of physicians' services.

The British Columbia Hospital Insurance Service

The British Columbia program inaugurated in 1949 is very similar to that in Saskatchewan. Virtually the whole provincial population was required to be insured until this past year either under this government program or under an approved non-government one.* Rates of contribution began originally at \$15 a person, increasing to \$24 for the head of family with one dependent and \$30 for head of family with more than one dependent. They have been raised and lowered several times, being \$27 a single person and \$39 per family last year. The collection of premiums has now been replaced by financing through a sales tax. In addition in 1951 a deterrent charge of from \$2 to \$3.50 for the first ten days in any calendar year was introduced. This was later replaced by a charge of \$1 each day for in-patient care regardless of the length of stay, and a charge of \$2 may be collected by the hospital for specified out-patient services.

Benefits were as comprehensive as those in Saskatchewan with respect to in-patient care, except that care for the chronic stage of a chronic illness (as decided in each case by the Service) is not a benefit. Hospital utilization has been consistently lower under the British Columbia program than under the Saskatchewan one. This is probably related to the smaller number of hospital beds, there having been between 5 and 6 per thousand population during most of the operation of the program.

With the high premium rate it was originally the hope in British Columbia to finance most of the Service without additional provincial contributions. The definition of "family" for premium purposes was generous, including parents, grandparents and in-laws financially dependent on the head of the family. Nevertheless, at these premium levels there seemed to be more collection difficulty in British Columbia. Consequently a fair number fell in the group who could not or did not pay their own premiums and whose premiums had not been paid on their behalf by the responsible government. Nevertheless in 1953 over 96% of the total population were estimated to be covered under the Service or the approved non-government programs.

Among the peculiar problems of the British Columbia program is the great mobility of the working population and the population concentration in two major centres. A payroll deduction method had to be employed as well as the direct method of collection used in Saskatchewan, and this is one of the reasons for the administrative costs being in the neighbourhood of 6% in 1953. However, this cost included the Hospital Services Division, which provided a complete inspection and consultation service to hospitals in all phases of their operations.

*Of which there were only two covering a negligible proportion of the population.

Although utilization under the British Columbia Hospital Insurance Service is less than in Saskatchewan,* per diem hospitalization costs have always been high in British Columbia, averaging about \$12.50 in 1953. Thus the total cost of the Service approximated \$21 per capita covered population. About two-thirds of the total revenues have come from the collection of premiums, and nearly one-fifth from municipal and provincial payments of 70c per person per day for welfare patients. This leaves about 15% of the total cost which had to be met by general provincial revenues (9).

In 1954 premium collections were discontinued, to be replaced by revenues from a general sales tax. Eligibility has thus become dependent on medical need and residence in the province rather than on prior payment of a premium. The program is now really a hospital service rather than a hospital insurance plan. One would expect a significant reduction in the administration costs with this change, and a substantial reduction in the personnel required for the operation of the program. Mr. Detwiller, the able and successful director of this program for the past four years, was appointed to this post after the successful introduction of a sales tax administration in British Columbia. It is of interest that he saw the advantages of this step at least three years ago.

Unlike Newfoundland and Saskatchewan, the British Columbia Hospital Insurance Service is not administered by the provincial health department. It is under a separate government department responsible to the Minister of Health. Integration of overall provincial health planning is thus effected at the political (ministerial) or cabinet level rather than at the department level. In this respect British Columbia is more like an American state government than any other Canadian province, and in British Columbia the mental hospitals also are administered outside of the health department. At the local level hospital administration remains in the hands of the voluntary, or local government, hospital boards in much the same way as in Saskatchewan.

The Alberta Provincial-Municipal Hospitalization Plan

Over 200 separate local hospitalization programs are operating in Alberta under permissive provincial legislation, with supervision and subsidy through the Provincial Health Department. Fifty-one of these are operated by Municipal Hospital Districts, which have their own hospitals and were providing hospital care prior to the inception of the Provincial-Municipal Hospitalization Plan in June, 1950. In addition there are 14 Municipal Hospital Districts which do not operate their own hospital and consequently have made arrangements with local voluntary hospitals to provide care for their ratepayers and contract holders. A Municipal Hospital District may comprise one or a group of municipalities.

The remainder of the programs are operated by individual cities, towns, villages, and rural municipalities not included in any Municipal Hospital District. These local authorities make agreements with their local hospitals to provide care for their ratepayers and contract holders. It is their responsibility to levy and collect a hospital tax on real property, sell contracts to non-ratepayers, and pay the hospitals giving the services.

*166 admissions and 1,680 adult and children days of care per 1,000 covered population in 1953 (8).

Nearly all municipalities in the province have made the above arrangements to provide standard ward care to their residents. Once an area has made such an agreement, the program is compulsory for its ratepayers, who are estimated to number between two-thirds and three-quarters of the provincial population. It is voluntary for non-ratepayers who may avail themselves of the same benefits by purchasing a contract which ranges in price from \$8 to \$14 per annum. It is estimated that only about 20% of these non-ratepayers have purchased contracts. Coverage for standard ward care with or without extras under these programs is therefore estimated at about 75% of the provincial population of about 1,000,000, with most of the non-ratepayers who have not bought contracts living in the larger urban areas. In July 1953 the program, which up to that time had provided for standard ward care only was broadened to provide hospital "extras". It is estimated that 50% of the population live in areas where coverage for both standard ward care and "extras" is available. For a Class A hospital (large city hospitals) the standard ward care rate established by the province is \$8.25 a day, and for extras \$4 a day. The patient is charged \$1 a day under the standard ward program, and \$1 a day under the extra's program, and the balance is shared equally by municipality and province.

The province also contributes to hospital costs through a 70c per diem grant paid on behalf of all residents admitted to hospital. The province also has a separate hospitalization program for maternity care for provincial residents, up to 12 days for any one confinement, and a hospitalization program to provide care for certain categories of provincial public assistance recipients, and other dependents. Medical care is also provided for the latter group.

In the Municipal Hospital Districts owning their own hospital, administration of the hospital insurance plan is thus integrated with administration of the hospital. In the other cases, hospital insurance administration has become another function of local government. In both cases administrative costs are minimized and cannot be separately identified.

In 1953 about 410,000 people lived in the 65 Municipal Hospital Districts which operated their own hospital or made special arrangements with voluntary ones. Charges to ratepayers ranged from 2 to 22 mills on assessed valuation, the average exceeding 6 mills. Contract rates for non-ratepayers ranged from \$8 to \$14 per annum. The total amount expended by all the general hospitals of the province in providing care to all persons hospitalized approximated \$21 million for the calendar year 1953. This represented care for 1,731,621 patient days, excluding nursery days, or an over all utilization of 1,700 patient days per year for every 1,000 population.

Of this total of 1,731,621 patient days, 684,919 were under the Provincial-Municipal Hospitalization Plan, 225,774 were paid for as part of the services provided for the Social Welfare group, and 18,822 were provided for orthopaedic care. Of the remaining 600,672 days, some were paid by the Dominion on behalf of D.V.A., D.N.D. patients, and treaty Indians, some represented non-residents of the province, and the balance remained the responsibility of the individual patients.

The total number of patient days in Municipal hospitals in 1953 numbered 414,966, or an incidence of approximately 1,000 per 1,000 population compared

with the provincial average of 1,700. Fifty-eight per cent of these days were incurred by ratepayers and contract holders under the Provincial Municipal Plan. Out of the remaining 42%, approximately 15% of the patient days remained the responsibility of the individual.

In 1953 the 51 municipal hospitals in municipal hospital districts operated at \$4,614,892.32 or approximately \$11 per person in the areas. Voluntary subscribers' fees provided less than 2% of total revenues, 39% came from provincial payments and grants, and the remainder was made up from municipal land taxes, and direct payments by patients. Additional expenditures incurred by 13 districts with agreements with voluntary hospitals totalled over one-quarter million, with most of the funds coming from local taxes and the province.

Information concerning utilization of hospitalization under these programs is limited—one of the penalties of such decentralized administration. Alberta has a strong tradition of local government, and this has obviously influenced hospitalization insurance developments. At their own discretion local authorities may provide care on an emergency or medical referral basis to local residents in hospitals outside the province or in the province outside their own District. The provincial health department also gives leadership towards coordination of these plans into an overall health policy, but Alberta still represents the extreme in local control of our four government hospitalization programs.

CONCLUSIONS

What conclusions may be drawn from what is now known of these four government hospitalization insurance programs? Without presuming to estimate their importance on future trends in medical care administration, the following suggested themselves to me:

(1) A universal comprehensive hospitalization insurance program is feasible on a province-wide basis. Such a program can be operated by a provincial government agency with a reasonable degree of efficiency, low administrative cost, and a minimum of partisan political interference.

(2) A universal and fairly comprehensive program, even if it provides for the chronic sick on a more limited basis, will cost governments substantially more than they are now paying in provinces without such hospitalization insurance plans. To some extent this is only a transfer of existing expenditures from private insurance or personal expenditures to public accounts. But to some extent also, under such a program there will be an increase in total expenditures for hospital care, and it may be a substantial increase.

These increased expenditures would not, in a country as prosperous as ours, divert from necessary capital investment sufficient sums to cause any decrease in total productivity. They may cause a diversion of consumer goods expenditures from other items to hospital care. Some may argue that it is desirable to devote a larger proportion of our consumer and government expenditures to hospital and health care. I personally have never felt that the 4% to 5% of total consumer expenditures on all medical and health care was necessarily optimal. The real question that now remains unanswered is "What is the optimum level of hospital care?"

(3) Government hospitalization insurance plans may be operated successfully in a variety of ways and still meet basic social needs in different provinces. Administration by a provincial department of health, or by a government commission, or by local or regional hospital plans with provincial assistance and supervision, are all feasible. Within certain limitations a wide variety of methods of collecting taxes, establishing eligibility, providing benefits and administering the payments to hospitals—and even of administering the hospitals themselves—may be made to work in harmony with provincial and local traditions. However, our limited experience to date suggests that some of these methods have some advantages over others.

(4) For example, with respect to collecting taxes or premiums to meet the costs of these programs, it seems clear that there is a psychological or political, if not an exact actuarial limit, to what can be collected as a poll tax or annual contribution for hospital care. In no province in Canada have the complete costs of hospital care ever been met almost entirely by a direct head tax, with or without additional small charges to the patients at the time of illness. Under the conditions of comprehensive hospitalization insurance it seems clear that not more than about half the total costs may be expected to come from direct per capita premiums or hospitalization taxes.

(5) The evidence is not clear-cut as to the value of financial deterrents to hospital utilization, in the form of charges to patients at the time of illness. Even in British Columbia, where the greatest variety of changes in this method was introduced, the conditions at no time approached that of a controlled experiment and other deterrents such as the availability of beds were operating at the same time. Certainly it can be said that the value of such deterrents still remains to be demonstrated in the face of a number of theoretical disadvantages. Suggested disadvantages have been the administrative cost of collecting the charges, and the possibility they may defeat some of the social objectives of hospital insurance by limiting the degree to which the costs of illness are pooled and redistributed.

(6) Hospitalization insurance is not necessarily the best of three possible methods of pooling the risks of hospital care, and thus of supplementing or replacing individual and family payments by assistance from public resources. The first and traditional method is of course that of public provision for the indigent only, leaving the rest of the population to their own resources. In this case eligibility for benefit is dependent on demonstration of economic need or the passing of a means test. The second method, exemplified by all of these programs up until 1953, makes eligibility for benefit dependent on prior payment of premium. It is therefore an insurance method. This is also the method used by voluntary and commercial hospital insurance plans. In a universal program the insurance method still leaves us with the administrative costs and political objections to the means test, since some will be unable to pay even the premiums.

The third method is that of a community health or hospitalization service in which eligibility for benefit is dependent on residence or medical condition and not on economic need or prior payment of a premium. This approach is used in the British National Health Service and, since the recent change, in the British Columbia hospitalization program. This method is basic to most

public health programs, such as the provision for tuberculosis and mental illness in most provinces and cancer in some. In actual practice certain local health insurance programs, such as the Swift Current plan and to some extent the Newfoundland program, also base eligibility on residence rather than prior payment although in theory they are insurance programs.

Which of these three methods will be selected in any one situation probably depends on the political attitudes of a population more than on administrative advantages or disadvantages. Political trends in the western world seem to be towards the third method. It is apparent from our experience in British Columbia that the administrative difficulties of the insurance method in an urbanized, mobile industrial society have political implications also. There is no evidence from any of these programs that the contributory principle inherent in the insurance method is of any great value in encouraging greater responsibility by the patient or in deterring excessive utilization.

The community health service approach is not necessarily incompatible with local administration or participation by voluntary non-profit agencies. As government interest in overall health planning and in the financing of treatment services increases, the administrative advantages of the community health service approach may become more apparent.

REFERENCES

- Acknowledgment is made of numerous publications and private communications from personnel of the four medical care programs discussed and of the Research Division of the Department of National Health and Welfare.
1. Hatcher, G. H.: Trends in Medical Care Organization. I. Their Relation to Public Health Practice. *Canad. J. Pub. Health*, 1953, 44: 363.
 2. Canadian Public Health Association: Report of the Committee on Social Security. *Canad. J. Pub. Health*, 1953, 44: 385-386.
 3. Goldmann, F.: Medical Care. New York, Social Work Year Book, 1954.
 4. Canadian Hospital Association: Hospitals. Toronto, 1952.
 5. Saskatchewan Hospital Services Plan: Annual Report, 1953. Regina.
 6. Roth, F. B. et al.: The Saskatchewan Experience in Payment for Hospital Care. *Am. J. Pub. Health*, 1953, 43: 752.
 7. Ontario Department of Health: Annual Report for 1952 upon the Public General Hospitals, Private Hospitals, Hospitals for the Chronically Ill, Convalescent Hospitals, and Sanatoria for Consumptives. Toronto, 1953.
 8. British Columbia Hospital Insurance Service: Annual Report, 1952. Victoria, 1953.
 9. Detwiller, L. F.: The British Columbia Hospital Insurance Service. Presented before the Medical Care Section, November 10, 1953, of the 81st Annual Meeting, American Public Health Association.

An Objective Approach to the Problem of Stream Pollution

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ONE of the more complex problems facing public health officials is the subject of stream pollution; or as it might be more aptly phrased—the beneficial usage and control of abuse of the streams and other water courses of this country. The importance of water-borne disease is generally recognized, and hence the onus of controlling local river pollution has fallen, logically enough, on the various Provincial Health Departments, with the Dominion authorities keenly interested in like problems of national significance. Within recent months, the reported contamination of the North Saskatchewan River near Edmonton aroused widespread interest. It indicated the possibility of chemical or biochemical pollutants being carried by a stream, with a drainage basin of some one hundred and fifty thousand square miles, a water distance of over nine hundred miles; and enroute disrupting the normal potable quality of this water source for domestic use at Prince Albert and Battleford in Saskatchewan and for the Town of The Pas in Manitoba.

This incident provoked a full-scale investigation by federal agencies on the representation of the concerned prairie provinces. Probably the most significant result of the whole episode was the realization that there exists no adequate legislation to cope with such a serious threat to community service and public well-being. On an interprovincial basis it might appear that a form of joint agreement should be drawn up respecting the control of pollution of water-courses crossing the intersecting boundaries.

It may be said that many, if not all, of the provinces have regulations or other legislation designed to control or restrict the discharge of domestic sewage and other wastes into surface waters; and that invariably, these powers are contained in or are pursuant to a public health enactment. The regulations are generally prohibitory in phrasing, if not in intent; and in view of existing conditions in some parts of our country, we may wonder if these enactments are actually enforced, or if they are retained only as a contingency measure in case of need. In other words, is the control of pollution a part of every planned preventive health program, or is it relegated to a minor role and generally ignored?

Another significant point is whether or not existing anti-pollution legislation does not place an unreasonably heavy responsibility on the local health officer; even if he may have access to technical advice and assistance from the Pro-

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vincial Department or Board of Health. Further, there are not always the facilities and staff available to carry out essential surveys and make the various analytical determinations which are a necessary part of either a planned or emergency program.

While it is agreed generally that there is a potential hazard in sewage-laden streams, at what point does this threat become an actual menace to the public health? In almost every case, local conditions will be the determining factors in assessing the relative hazard of a contaminated water course. It follows, also, that the united efforts of all concerned preventive-health personnel, including inspectors, medical directors, chemists and engineers will be required to cope with the many and varied situations arising from this broad, general problem.

In an effort to formulate an objective approach to the significant problem of the control of stream pollution, one might establish a major premise that the nation's water courses are equally *important* to the good health and well-being of the public, and *valuable* as a great natural resource of the country. It follows, then, that as such important adjuncts to a bountiful environment, the rivers and streams should be closely supervised, both as to usage, and to control of abuse.

DUAL AUTHORITY: DIVISION OF RESPONSIBILITY

It would appear that two, not one, governmental agencies are concerned with the problem of stream pollution. The local medical officer must retain sufficient power to protect the general health of the public and take any necessary emergency or precautionary measures in case of an imminent or threatened outbreak. On the other hand, the contemporary conservation official might be equally concerned, but in this case in regard to the protection of a valuable natural resource. Again, the task of supervision might be eased once the public realized that precautionary control was one method of ensuring the continuing usefulness of one of nature's great gifts to mankind. Dual authority with an equitable division of responsibility could, contrary to popular thinking, provide the sturdier if not less cumbersome bulwark for the protection of the public health and well-being.

Legislation

Hitherto, most anti-pollution measures have been enacted pursuant to provincial public health acts. Certain Federal statutes having to do with such varied subjects as navigation, harbours, fish, migratory birds and criminal activities contain sections dealing with the discharge of debris, waste, oil, and other contaminants. The inclusive total of such legislation might appear adequate to cover any possible contingency outside the scope of provincial health acts, but there are two fundamental reasons why the various laws and regulations may prove ineffective in the control of pollution. First, it is logical to believe that each specific legislative enactment has been framed for an express purpose; in one case to protect boat hulls and marine engines from physical damage; in another to safeguard migratory wild-fowl; and, in the field of our particular interest, the preservation of public comfort and health.

The second difficulty is that our concept of sound preventive measures includes assistance and education but little pretense at policing or regimentation except as a last resort.

The well-planned and progressive public health education programs now in effect throughout the country comprise one major and basic stone in the foundation of a reasonable solution of the pollution problem. With public appreciation of the potential danger of uncontrolled sewage-laden waters, it should be possible by suitable labelling to use rivers and streams to better advantage for the final disposal of effluents and wastes not only without increasing, but possibly minimizing the possible hazard from water-borne disease.

Proposed Statutory Control

It is suggested that adequate control of watercourse pollution requires comprehensive but not necessarily bulky legislation based on both protection of the public health and conservation of a major natural resource. Provision must be made for the correction of nuisance or insanitary condition, and for any necessary expedient in case of actual or incipient outbreak of disease. The enabling authority in this regard must rest, as at present, with the Minister or Medical Officer of Health. However, much of the regulatory detail, including technical examinations and tests, could, with advantage, be passed to an equivalent governmental agency where basic interest is the conservation of our streams and watercourses in as nearly a natural state as is economically and practically possible, consistent with the economic needs of the country.

The Province of Manitoba has both types of legislation in effect. The Medical Officer has the authority to act with despatch in any situation endangering the public health; but the overall supervision of the general aesthetic, attractive and useful condition of provincial watercourses rests with a sanitary control commission under the administration of the Minister of Mines and Natural Resources. This arrangement of dual authority may appear unwieldy, but it does relieve the health official of the more vexatious part of a relatively intangible problem.

Administration

In effect, the Provincial Control Commission, as set up under "The Pollution of Waters Prevention Act", has the power to assist in the forming of sanitary districts, to require schemes for the abating or control of pollution, or to prescribe such schemes or suitable alternatives and to generally supervise all matters concerning possible contamination of surface water sources. The most significant single item of the Commission's authority is the right to issue licenses for the discharge of waste into streams, to prescribe the terms on which such licenses may be issued, including the type and degree of required treatment in any particular instance, and to penalize non-compliance or discharge without license in a substantial and salutary manner.

Under the public health act in this province, regulations may be set up by the Minister for, amongst other things, the general protection of the public health, the approval or otherwise of projected municipal sewerage systems

including treatment processes, and in the absence of specific regulations under "The Pollution of Waters Prevention Act", such measures as may be necessary to control, confine and restrict pollution of surface waterways.

More directly, one authority may issue licenses for the discharge of wastes and stipulate the degree and type of treatment required in addition to any provisos related to local conditions and the preservation of the physical, chemical and bacterial characteristics of the stream with relatively heavy penalty for non-compliance; whereas the public health agency may ensure that no major sources of dangerous contamination such as municipal sewerage schemes are initiated without adequate planning, design, installation and operation.

Practical Application

In practice, it might appear that the program of the two authorities might conflict, or at the least, that there might be some over-lapping of otherwise laudatory effort. In order to prevent such mischance, it is essential that both agencies not only work in complete accord, but that each subscribe to a joint policy, or pre-plan by setting out complementary documents in this regard.

The Sanitary Control Commission of Manitoba has outlined such a declaration; including, amongst other things:

1. *The General Basis for the Policy*, relating the need for indices of pollution, the place of river surveys, the privileges and need of industry, commerce and the public, and the necessity of zoning surface watercourses to suit particular local conditions.
2. *Specific Proposals* in regard to licensing of outfall agencies; the empirical grading of the major watercourses; the prescribing of bacterial, chemical, bio-chemical, physical and other indices of pollution; the categories and types of sewage-waste treatment processes.
3. *The Planned Program* of the Commission including the expansion of the Greater Winnipeg Sanitary District; the review of other major agencies of pollution; the effective implementation of relevant statutes and regulations; and the continuing survey of the more important watercourses of the province for the purpose of general grading and local sub-zoning.

With the publication of this policy, it should not be too difficult to outline a complementary brief on the health officer's duties, responsibilities, and power, in addition to defining the channel for diverting technical and major problems to the Control Commission.

Technical Work

The technical part of the program inherent with a comprehensive pollution control policy is being carried out by public health engineers with the part-time assistance of one chemist and the staff of the bacteriological division by mutual arrangement between the interested departments which divide the costs of the field work on an equitable basis. With the substantial support afforded by the provisions of the Federal Health Grant system in extending public health services, a sound and potentially fruitful program is now underway. The same group of technical officers in effect work for both departments so that there is

minimal chance of either duplication of effort or conflict in direction. As part of the overall policy there is at present under consideration the advisability of naming statutory members of the Commission, to include one nominee from the Department of Health.

Any project such as the present pollution control program in Manitoba carries with it the requirement for additional administrative and technical personnel. These needs are being carefully checked to the point that, to date, all administrative work has been absorbed by existing offices and staff; and the increase in technical establishment related directly to the work in the field.

WATER QUALITY CRITERIA VERSUS STREAM CLASSIFICATION

A discussion on this subject would hardly be complete without some reference to the various yardsticks used in planning and implementing stream pollution control programs. Only by setting out certain standards, even if these be rather idealistic can progress be made towards ultimate improvement and sound but safe usage of our watercourses.

Classification

One expedient is the attempt to classify, or grade, streams, rivers and lakes on the basis of expected or desired use. There would be little point in evaluating the watercourse in terms of present conditions, except in practically virgin territory, since obviously no improvement would be expected or attempted in the future. One exception to this general rule might be small lakes in mining areas which have been totally relegated to the role of disposal of slimes from the mining operations. Secondly, in setting up a classification scheme the rights of all concerned parties must be considered; not only those agencies now making use of the concerned stream. This, in turn, leads to the point of providing for future expansion and consequent demand for a share in the useful qualities of the watercourse.

Then, on the threefold basis of critical stream flow, peak pollution loads and foreseeable future requirements, it might be possible to integrate public demand for a reasonably clean environment with other social and equally important economic factors and set an empirical classification of the river or stream which would serve as a deterrent to misuse of the waters and result eventually in a more balanced and less obnoxious or hazardous situation.

This procedure or system may appear unwieldy, laborious, and relatively tedious with attendant requirement for large technical staff and continuing administration, since each new industry or municipal sewerage project in the basin would have to be integrated into the overall scheme for that particular watercourse. It has the advantage however, of placing actual facts and conditions on record, publicizing the relative safety or alternately insanitary quality of the stream, and eventually realizing the maximum use of the waters in the public interest and without prejudice to the public health.

Objectives for Water Quality

The present trend, in lieu of classification, appears to be towards the defining of suitable objectives for water quality and the setting up of a suitable control

authority which may either recommend or actually enforce existing measures now incorporated in regulations or sections of such legislation as provincial public health acts.

This procedure is worth very serious consideration, particularly when it is either difficult, inexpedient or confusing to design new legislation and additional regulatory boards or commissions. By clearly enunciating the general aim and policy and the specific quality level at which all watercourses are to be raised and then maintained, there is reasonable assurance that the prime requisite of public comfort and well-being is adequately protected without undue restriction on industrial and municipal expansion. To be workable, this system must be based on sound scientific principles, should be framed in such a manner that it serves equally well in providing definite measurements of pollution and stability as in allowing a flexible application in the light of current and individual requirements; and should be capable of relatively swift adjustment or modification with future development of the province or state.

Effluent Criteria

Neither of the above-mentioned control procedures can be implemented without describing various objectives for the bacterial, chemical, bio-chemical, physical, and toxic content of industrial domestic and other wastes including the effluents from the various individual or group sewage treatment plants. This ancillary set of rules may serve well in the primary step of approving or otherwise in principle any new or contemplated major industrial or public project or outfall. In actual operation, the limitations imposed by either stream classification or water quality criteria are then used to impose any modification or alteration to the waste treatment facilities of the individual plant or sewerage system.

An Integrated Program

Both previously mentioned methods outlined are subject to considerable criticism, generally on the basis of non-flexibility and the unjustified assurance that by grading a stream or setting up idealistic standards the objectives are realized automatically and without further intensive planning and action. Again some authorities may differ considerably in their interpretation of reasonably safe indices of pollution. Basically, the problem is complicated because so-called dangerous pollution cannot be defined scientifically; definite and practical legislation cannot be framed to encompass the varying general requirements, and at the same time, cope with individual situations.

In an attempt to plan a suitable and workable compromise, the Sanitary Control Commission of Manitoba has evolved a combined river grading and water quality system which, it is expected, will provide suitable assurance for the continuing health of the public, with the maximum economic and aesthetic benefit as well as envisaging the possibility of abrupt and large-scale changes in the future of this province.

To place the present condition and future possibilities of our watercourses before the public, a system of grading has been initiated: Grade I referring to good natural streams with practically no pollution load, the waters of

which require only simple purification procedures for safe consumption, Grade II those watercourses subject to controlled usage but still capable of being reconditioned and purified for domestic use with normal two-stage treatment, Grade III those waters requiring complex conditioning and purification, and Grade IV embracing a possible category beyond economic reclamation. As interim measure and to ear-mark those locations or situations which require individual attention or temporary or semi-permanent concessions, sub-classification will be adopted; local zoning: shadow sections adjoining built-up areas, industrial locations, restricted zones upstream from municipal water intakes, and recovery stretches of rivers following major outfalls.

This plan, in conjunction with the licensing of large-scale pollution agencies, should do much towards the eventual utilization of our watercourses to the best public advantage without the disadvantages of too-rigid dependence on stated water or effluent standards.

SUMMARY

There is no pretense that the plan now being tried in Manitoba is either universally acceptable or the best solution to the problem of controlling stream pollution. It is, however, a direct approach to an otherwise difficult and relatively obscure subject with the added feature of removing technical detail from the health authority and imparting some degree of general supervision and planning to an impartial agency.

The system of licensing major river-use agencies would appear to have the practical advantage of direct control enforceable with heavy penalty; while at the same time, industry particularly is afforded some protection against unreasonable or impetuous demands for corrective measures. This, coupled with the planned use of the better features of both the river-classification and the water-quality-criteria methods of stream evaluation, would appear to provide a sound basis for immediate control and a flexible long-range program for eventual stream improvement.

The requirements for additional staff may be kept at a minimum by careful thought and planning, and the placing of the onus, both for effective design of treatment and analytical determinations, on the agency requesting a license to discharge sewage or industrial waste.

Finally, by continuing the valuable public health educational programs; and surveying, grading, and zoning the watercourses, all concerned individuals, corporations, and agencies are kept advised of the relative condition of each river and stream, the purposes for which it may be used with immunity, and the considered hazard to the public health.

Letter from Great Britain

Population in Britain

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THE population of any country is built up as the surplus of births over deaths, or by excess immigration over emigration. Whether the population increases or decreases, ignoring migration, depends upon the balance between fertility and mortality. During times which permit of observation of at least reasonable accuracy, the peoples of the world have proceeded numerically along a curve, in which five episodes or stages can be discerned. Stage 1 is that in which the population is stationary because a high death rate cancels out a high birth rate. In stage 2 the population begins to expand with a falling death rate and a continuing high birth rate. In stage 3 the population continues to grow, because fertility exceeds mortality, but the birth rate has begun to decline and the rate of increase is less. In stage 4 the population again becomes stationary with a low birth rate and a low mortality, and in stage 5 the population declines as the babies born are less than the deaths.

TWO CENTURIES OF GROWTH

The Demographic Cycle

We ourselves in our tiny island embarked upon the upward track towards the middle of the 18th century. Our population has advanced from around 8 millions to 51 millions. This process was stimulated, although the exact relationship is uncertain, by the industrial revolution. When I say that the relationship is uncertain I mean that it is not clear to what extent an actual swarming process took place as a direct result of an increase in fertility or whether the increase was due entirely to an increase in survival which was the result of social changes. It is well known that fearful mortalities accompanied the early stages of the industrial revolution in the last quarter of the 18th century and the first half of the 19th century. These do not entirely support an increase in the rate of survival as the only cause for the increase in our population and it is reasonable to suppose, therefore, that some time after 1750 the rate of fertility of English peoples advanced sharply.

The phase of early expansion (the second phase) lasted from about 1750 to some time about 1875, when fertility began to decline from about 35.0 per 1,000 in 1865-80 to as low as 14.7 per 1,000 in 1936-40. We have now reached the end of the fourth phase. A slight yearly expansion continues but we can now be said to have entered upon the low stationary phase.

FUTURE TRENDS

A Declining Mortality

The population of Great Britain now increases a little each year. Our ability to reproduce ourselves is aided by an excess of women of child bearing age. For our present population and mortality about 700,000 births are required each year; this needs about nine million women aged 15-45, if each is to produce one female child during the span of child bearing. We have eleven million such women. The excess of child bearing women helps to offset a fall of fertility below replacement level. Changes in mortality, as in the past, will also affect the population increase. We can expect further reductions in deaths at most ages. Infant mortality is lower in many countries than it is in Britain, and it is reasonable to suppose that we can achieve what others have done before us. The rate in New Zealand in 1950 was 23.3 when our own was 29 per 1,000 babies born alive. Infant mortality is much greater among the unskilled workers than in the higher social classes; it is lowest among the professional and managerial class. Many diseases at higher ages will be controlled. Tuberculosis is likely, for example, to disappear in perhaps a decade, with a saving of 16,000 lives, mainly at a reproductive age. The royal commission on population in its projections estimated that the infant mortality per thousand females would in 1977 be 21.7 as compared with 44.4 in 1942-54. They estimated that child mortality between one and four years would fall from 3.0 to 0.7. The commission also thought that there would certainly be a continued fall in death rates at higher ages with the continued exploitation of sulphonamides and penicillin and the increasing research upon the diseases of old age. Further advances in the health of the ageing population may be expected as the time comes for those to become old who were born in the more favourable social conditions of the past two decades.

Declining fertility

In contrast with the reasonable certainty that we have about a further decline in mortality we are able only to guess at the future trends in fertility. The annual number of marriages, the age of marriage, and social patterns about the size of the family, must all affect this issue. Since 1935 marriage has taken place earlier and has been more complete. Family limitation, according to the fertility enquiry of the Royal College of Obstetricians and Gynaecologists, is not yet universal in this country. If it were to become so, a further 10 per cent drop in the number of births would occur. But the spread of family limitation, to those who do not at present practice it, will be slow. Many object on religious grounds and others lack the intelligence to adopt the practice. Even with family limitation, there are, according to the same source, at least 10 per cent of babies born to couples practicing it, not including those who wish children but not at the particular moment when conception occurs. Unless a revolutionary new procedure is evolved, as for example, chemical by mouth, family limitation and the numbers of unwanted babies will not now alter greatly.

Taking all into account, the royal commission on population said, "One future development, however, we *can* forecast with a good deal of confidence,

namely, a substantial decline in the annual number of births over the next fifteen years". Even if the family size increases by 6 per cent above that of the 1927-38 marriages, we can expect a falling off of over one-sixth of the births.

Social Changes in Fertility

The decline in fertility has not been uniform in all sections of the population. It began with the professional and managerial class and has spread down through the non-manual to the manual elements. In the Registrar General's classification it has thus progressed from social class I to social class V. This process may continue. There may be fewer births in the lower social classes, following the changes that have already taken place in the higher social classes. Such evidence as exists suggests that the gap between the manual and non-manual groups has been stable for 30 to 40 years, dependent no doubt upon social qualities and objectives which affect family practices. Further radical changes in our social structure may be necessary before the groups approach each other more nearly in fertility.

There is evidence that the fertility of the professional and managerial class is increasing. As Hutton (1) showed, "There is evidence of a steady increase in family size, so that it may be expected that the 1921-25 group will have not merely more children than the average of the population, but even just enough for replacement". The observation of rising family size has also been noted in the new towns. The family has fallen from its victorian level of $5\frac{1}{2}$ -6 to a figure of about 2.2 for the whole country. In Harlow New Town the family size is now running at 3.2 and many think it will rise to 4.0.

A Static Population

Despite these many uncertainties we can say with some measure of assurance that our population will remain little altered for the next thirty years. The royal commission on population (Cmd. 7695) estimated a population of 50.7 millions in 1977, assuming family size remained as at 1927-38; 51.8, if the family size increased by 6 per cent; and 48.6, if the family size fell by 20 per cent. The number of workers between 15 and 40 would also remain constant in all three cases. The effect of this prediction is remarkable. After 200 years during which our population has been changing yearly we can now expect to enjoy, if that is the word, for the first time a static population.

REFERENCES

1. Hutton, K.: *Eugenics Review*, 1952/53, 44: 214.

Canadian Journal of Public Health

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STUDIES IN TUBERCULOSIS

DR. R. G. FERGUSON is the author of an important new book entitled "Studies in Tuberculosis." His name is known throughout Canada for his great work in the control of tuberculosis.

Dr. Ferguson is now enjoying a well-earned rest following many years of service as Director of Medical Services and General Superintendent of the Saskatchewan Anti-Tuberculosis League. He has had many honours bestowed upon him, including Officer of the British Empire and honorary Doctor of Laws from the University of Saskatchewan. On his retirement hundreds of Dr. Ferguson's former patients gathered at Fort Qu'Appelle and presented him with a gift with the direction that it should be spent not on "some good work" but for his personal use. Undoubtedly Dr. Ferguson treasures the appreciation and affection of his former patients more than any other honours which he has received.

As the title of his book indicates, its chapters present a series of studies in tuberculosis designed to throw light on disputed problems associated with this disease. Dr. Ferguson is an experienced epidemiologist and the depth of his insight into the problem of tuberculosis is shown in the excellent Chapter "Epidemiological Factors in Tuberculosis". Here are presented the influences of race and family on susceptibility; of age on mortality; of the effect of population movements, and other important factors. For many years he searched for information and collected data on the occurrence of tuberculosis in the Indian population in Saskatchewan. His data indicate that there was a prolonged tuberculosis epidemic among the Indians of the Qu'Appelle Valley from 1874-1926. The experience of the Indian population recently exposed to tuberculosis was in contrast with that of the white race exposed to this disease for centuries. In the acute stage of the epidemic a large portion of the Indians appeared to have less ability to localize the disease. Dr. Ferguson points out, "These Indian tribes concentrated on reservations in Saskatchewan in 1881, without knowledge of sanitation or prevention and surrounded by tubercularized white settlers, resembled an experiment in rapid and intense exposure rather than the natural spread of the disease." His rich clinical experience has enabled him to present a challenging interpretation of the problems of infectivity and resistance. In his final chapter entitled "Foundations of a Preventive Program,"

he presents his views on the prevention of human tuberculosis and the subject of rehabilitation of ex-patients.

The Canadian Journal of Public Health thanks Dr. Ferguson for making available in this book his views on tuberculosis and for sharing the results of a lifetime of study of this important public health problem.

PLANS FOR USING POLIOMYELITIS VACCINE

IN 1953, Dr. Jonas E. Salk, University of Pittsburgh, reported that a group of children had received poliomyelitis vaccine prepared by him and that serum samples had shown a satisfactory increase of antibodies to the three recognized types of poliomyelitis viruses. These findings confirmed his earlier work in monkeys. In the spring of 1954, more than 400,000 children in the United States received the vaccine and a control group received a harmless placebo. The studies of Dr. Salk and the nation-wide trial of the vaccine last spring were supported by the National Foundation for Infantile Paralysis, Inc., New York, as part of an extensive program of research in poliomyelitis conducted by the Foundation since its establishment in 1940.

As part of the trial, the Foundation arranged for a comprehensive study to be made by Dr. Thomas Francis, Jr., of the University of Michigan. This study is a very large undertaking. Records have been provided of the children who either received the vaccine or served as controls. Children in the observed groups who suffered any illness which resembled poliomyelitis were carefully examined and their illnesses investigated. Stool specimens were obtained and submitted for examination for poliomyelitis viruses. In this way it is hoped that specific information as to the occurrence of poliomyelitis among the vaccinated children will make possible an answer to the effectiveness of the vaccine. It is realized, of course, that the vaccine may have been used in areas where the incidence of poliomyelitis was much below the average rate and such groups of children will provide less information. The incidence last year in the United States was less than the immediately preceding peak years. To obtain data concerning the value of the vaccine as an antigen and to determine if different lots of vaccine varied in their antigenic value, as well as the rate of production of antibodies following the first, second and third doses of the vaccine, appropriate blood samples were taken, the third sample being taken one month after the third dose. To permit the great amount of laboratory work required in this study, twenty-seven laboratories in different parts of the United States and Canada provided facilities and these have been co-ordinated into an effective group by Dr. Francis and his associates.

It is expected that a report will be published by Dr. Francis early in April. This report will probably be based on the data relating to the occurrence of poliomyelitis among the vaccinated children as compared with the control group. The serological findings, which will answer a number of important questions relating to the antigenic value of the vaccine and dosage, will probably be published at a later date as this part of the laboratory work would require more time.

Although no statement has been made by the National Foundation for Infantile Paralysis regarding the trial, it can at least be inferred that the

vaccine was administered without untoward incidents and that it is safe for use as prepared by Dr. Salk's method.

In the Connaught Medical Research Laboratories, through the support of the National Foundation for Infantile Paralysis and public health research grants of the Government of Canada, studies of poliomyelitis virus have been conducted since 1947. These studies were conducted under the direction of Dr. A. J. Rhodes until he became Director of Research for the Hospital for Sick Children, Toronto, in 1953, which work has been continued and the production of vaccine undertaken. With the announcement of the successful growth in tissue culture of poliomyelitis viruses in both human and monkey tissue by Enders, Weller and Robbins in 1949, Dr. Rhodes employed medium 199 which had just been developed by Morgan, Morton and Parker in the Laboratories. Much higher titres of poliomyelitis viruses were obtained and subsequently further improvements in the culture methods were made by Dr. Leone N. Farrell. As a result it was possible to obtain cultures in large quantity. A large part of the virus culture fluids used in the preparation of the vaccine for the large-scale trial in the United States was prepared by these methods in the Connaught Medical Research Laboratories.

Consideration of the use of poliomyelitis vaccine in Canada was given last spring by the Department of National Health and Welfare and by the Provincial Departments of Health, and it was decided that a trial of the vaccine should be undertaken this spring, commencing in April, using vaccine prepared by the Connaught Medical Research Laboratories according to Dr. Salk's methods. It is planned that the children in the first and second school grades in the various provinces of Canada, approximately 500,000 children, will be offered the vaccine. The cost of the vaccine is being shared by the Federal and Provincial Governments. Those not desiring to receive the vaccine in these two grades, and children in other grades, will constitute a control group in the study of the incidence of poliomyelitis in these communities.

Since recent studies made by Doctor Salk indicate that the preservatives usually used in vaccines are destructive to the antigenic value of poliomyelitis vaccine, the vaccine as used in Canada in this trial does not contain a preservative. In view of the absence of preservative, the vaccine is being distributed in sealed glass ampoules. Unused contents of an opened ampoule must be discarded. It is also known that the vaccine must be stored in a refrigerator and exposure to room temperature should be for a minimum period.

There are no published reports of reactions following administration of the vaccine and it would appear that the administration is remarkably free from reactions. It contains only a trace of protein and cannot sensitize a person to horse serum or antitoxin.

It is anticipated that if the report of Dr. Francis is favourable, the vaccine will be licensed for distribution in the United States and Canada. If the product is licensed, plans have been made by the National Foundation for Infantile Paralysis Inc., to supply this spring, without charge, vaccine sufficient for nine million children in grades one and two in the United States. The vaccine will also be commercially available when it is licensed.

IMMUNIZATION: EQUIPMENT AND TECHNIQUE

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AND

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WITH the announcement by the Ontario Department of Health that poliomyelitis vaccine would be made available for administration to children in Grades I and II, local health departments were faced with a considerable task over and above their regular immunization programs. It was made more difficult because of the necessity of completing this special immunization according to a fixed schedule to be completed within a few weeks' time.

One was faced not only with the problem of mustering sufficient staff to handle this but also with the necessity of providing extra equipment, all within the limits of the budget. For this reason, we gave consideration to procuring only that equipment which would be of use to us in our regular clinics when the poliomyelitis campaign had terminated.

It would perhaps be of interest to record here a technique related to the equipment required for immunization which has proven to be practical and satisfactory in the every day work of this health unit for many years.

Five cc. Luer all glass syringes have proven most useful and easy to handle. Each cc. marked off in 0.2 cc. graduations allows for ease of administration of those agents, such as diphtheria toxoid, where small amounts of $\frac{1}{2}$ cc. or less, are administered as well as the standard 1 cc. dose.

Half-inch 25-gauge standard bevel needles are used routinely for administration of all immunizing agents. One and one-half inch 19 or 20-gauge

needles are used for the withdrawal of ampoule contents to facilitate filling of the syringes.

With the co-operation of the local hospital, all materials used for immunization are sterilized during regular autoclave runs. This obviates the need for a portable sterilizer and thus facilitates the work of the clinic.

The needles and syringes are cleaned and packaged by the health unit staff. For clinic purposes envelopes made of double thickness heavy factory cotton hold the syringes and needles. Envelopes, 18" long and 10" wide to allow one fold, contain twelve sections which hold six unassembled syringes. Similar but smaller envelopes, 12" X 5", have been designed to hold twenty-four 25-gauge needles and one or two large "filler" needles. These envelopes are packaged individually in factory cotton wrappers for sterilization. Adhesive tape labels are attached to identify the article and date of sterilization.

Although most syringes and needles are packaged in this way, to prevent wastage of sterilized equipment small packages containing one 5 cc. syringe and 5 needles are available for individual immunizations at the unit office or at the close of a clinic.

Other items wrapped separately for sterilization include small cotton towels, pie plates, glass custard dishes and jars, forceps, and cotton swabs.

The clinic immunization table is covered with a clean cover. A sterile field is made with one or two sterile towels. The envelopes containing

syringes and needles with the flaps folded under are placed in this sterile field. Alongside are the forceps in the glass jar containing antiseptic. Custard dishes containing skin antiseptic and sterile cotton swabs are placed on sterile pie plates near by for the use of the physician or attendant nurse.

Prior to opening, the necks of ampoules are swabbed with antiseptic. Up to six syringes may be filled at one time. When filled the syringes may be replaced with the ends in the slots of the sterile envelope until used. A syringe is filled only once. A separate needle is used for each individual. The needles are kept in the sterile envelope and handled only with the forceps. After use needles and syringes are discarded on another pie plate at the side of the set-up.

Arms, for all standard immunizing injections, are cleansed with an iodine alcohol solution. Tincture of iodine (2½%) 2 to 3 oz. to 16 oz. of alcohol gives an antiseptic mixture which delineates the swabbed area on the arm without the stain (or possible skin irritation) of full strength tincture. Acetone has proven most suitable for preparing the skin for small-pox vaccination because of its cleansing action and rapid evaporation, eliminating the nuisance spreading factor of vaccine when green soap is used to prepare the skin.

At the close of each clinic, needles and syringes are cleansed with clean water and dried with acetone and replaced in the envelopes. They are then ready for packaging and sterilizing.

THE CANADIAN PUBLIC HEALTH ASSOCIATION

announces the holding of its

FORTY-THIRD ANNUAL MEETING

in the

MACDONALD HOTEL, EDMONTON

on

SEPTEMBER 6, 7 and 8, 1955

in conjunction with the

ALBERTA PUBLIC HEALTH ASSOCIATION

NEWS



MISS ELIZABETH RUSSELL, Reg.N.
Retiring director of public health nursing,
Manitoba

MANITOBA HAS THE CREDIT of establishing the first provincial public health nursing service in Canada. Miss Russell directed the service from its commencement until her retirement last January. For thirty-eight years Miss Russell directed the work of this division, developing its staff until 82 graduate nurses are now providing province-wide service.

On the occasion of the fortieth annual meeting of the Canadian Public Health Association held in Winnipeg on June 16-18, 1952, tribute was paid to the great contribution made by Miss E. A. Russell to public health in Manitoba through her years of service as director of public health nursing services. On this occasion Miss Russell was made an honorary life member of the Canadian Public Health Association.

On January 28, a presentation was made to her by Dr. M. R. Elliott, Deputy Minister of Health, and the good wishes of members of her staff and her many friends were tendered her. Miss Russell's life of service has been characterized by faithfulness and devotion to her staff and to the people of Manitoba.

British Columbia

THE ANNUAL MEETING of the British Columbia Branch of the Canadian Public Health Association is scheduled to be held in the Art Gallery, Vancouver, B.C. on Tuesday, April 12, 1955. Guest speaker at the meeting will be Dr. Brock Chisholm whose topic will be "Canada's Role in International Health". Public health personnel from all over the province will be in Vancouver at this time attending the annual public health Institute from April 12 to April 15 at the Hotel Georgia.

PLANS ARE GOING AHEAD for administration of the Salk poliomyelitis vaccine to British Columbia's Grade I children (and those who will be entering Grade I in September). There are about 48,000 children in the above age groups and vaccine will be available for approximately 40,000 of these. The vaccine will be administered by public health personnel.

DR. DOUGLAS J. YEO, regional dental consultant with the Division of Preventive Dentistry, Department of Health and Welfare, has accepted a new appointment as director of the Dental Health Services of the Greater Vancouver Metropolitan Committee. Dr. Yeo is active in the British Columbia Branch of the Canadian Public Health Association and is serving as chairman of the Resolutions Committee.

Alberta

WITH THE APPOINTMENT of several new medical officers of health to a number of posts in the province including two newly established health units every Alberta health unit now has a medical officer of health.

The most recent appointments include Dr. John Russell of London, England, who is coming to the recently organized Peace River Health Unit and Dr. Brian Russell of Belfast, Ireland, who will in the near future fill the vacancy at the Minburn-Vermilion Health Unit. The medical officer of health for another new health unit in the province at the town of Jasper Place, adjacent to Edmonton, is Dr. Donald Whitmore, who relieved Dr. E. S. Orford-Smith, as medical officer of health of the Sturgeon Health Unit, while

the latter was directing the study-survey into the last Alberta poliomyelitis epidemic. Dr. Orford-Smith has returned to his position at Sturgeon.

DR. PETER CARMICHAEL has been appointed medical officer of health of the Vegreville Health Unit, and Dr. John C. Gillespie of Whatford, Harts., England, succeeds Dr. D. N. Keys as medical officer of health for the Stoney Plain Health Unit. Dr. Keys earlier went to Calgary as medical officer of health for the Bow Valley and Mountain View health units when he replaced Dr. M. P. G. Rawlinson who last fall was appointed to the Division of Occupational Health, Ottawa.

Other recent appointments in the province brought Dr. S. P. Casey of Belfast, Ireland, to the Grande Prairie health unit and Dr. H. Maurice Brand, from the Royal Air Force, London, England, to the Athabasca Health Unit.

Manitoba

MISS JESSIE WILLIAMSON has taken over the position of Director of Public Health Nursing for Manitoba, with the retirement of Miss E. Russell, January 31. Miss Williamson, a graduate of St. Boniface Hospital, with post-graduate studies at Columbia University where she obtained her Bachelor of Science degree, has been with the Department of Health and Public Welfare for 16 years. For the past 6 months, she has been acting in the capacity of assistant Director of Public Health Nursing, preparatory to taking over this position February 1.

SEVERAL THOUSAND LOCAL and district residents attended the opening ceremony February 3 of the new 65-bed Selkirk General Hospital and nurses residence. Mr. Ernest Setter, chairman of the hospital board, assisted by the Honorable Robert Bend, Minister of Health and Public Welfare, cut the ribbon which officially opened the new public building of modern low design. The Selkirk Health Unit occupies an entire floor of one wing, along with Laboratory and X-Ray Unit containing a modern X-ray room complete with the latest facilities for developing plates, a dressing room for out-going patients, the well baby clinic, and business offices. The new hospital will serve the residents of Selkirk and adjoining rural districts.

The Christmas Institute held for public

health nurses December 28 to 30 at the University of Manitoba was under the direction of Miss Margaret E. Hart (and not Miss M. E. Ring as stated in the December issue).

Ontario

THE ONTARIO DEPARTMENT OF HEALTH has completed preparations for the forthcoming trial of poliomyelitis vaccine to local health authorities throughout the province, and has asked parents and guardians of children concerned to cooperate with their local boards of health.

The Provincial Minister of Health, the Honorable Mackinnon Phillips, announced some weeks ago that a limited amount of poliomyelitis vaccine would be available in Ontario in April for elementary school pupils in the first two grades.

Since actual inoculation responsibility rests with the local authorities, the Provincial Department has supplied all requesting medical officers of health—full-time, part-time, and directors of health units—with full information about the proposed program and made available 250,000 parents' request forms. A signed request for inoculation, which consists of three separate injections, must be obtained by the medical officer from a child's parent or guardian before the vaccine can be given. Other necessary forms also were supplied.

The vaccine which will be used has been prepared by the Connaught Medical Research Laboratories, University of Toronto and it will be supplied without cost to the local boards of health by the Department of Health of Ontario. The use of the vaccine at this time in Ontario will constitute a further effort to ascertain the value of the vaccine.

THE LAST OF SEVEN regional conferences involving senior public health personnel will be held in Fort William on March 15 and 16.

In compliance with a request from the Ontario Public Health Association the Provincial Department of Health organized and is sponsoring these meetings and has divided Ontario into seven conference areas. Fort William is Area 7. Previous gatherings were held in Brockville (Area 1), Toronto (Area 2), Hamilton (Area 3), London (Area 4), Barrie (Area 5) and North Bay (Area 6). It is expected the conferences will be held on an annual basis.

Represented at the conferences are full-

time medical officers of health, public health nurses, sanitary inspectors, veterinarians and dentists. Similar representation is applicable for part-time medical officers whose boards of health employ full-time public health personnel.

Programs include such topics as milk legislation, suburbanization, food sanitation, maternal and infant morbidity and mortality. The programs are prepared by the Ontario Department of Health. The Provincial Departments of Planning and Development and Agriculture, together with representatives of the federal division of food and drugs, also participate.

At the conclusion of the seven conferences an analysis will be made of their value and of the recommendations submitted by each.

New Brunswick

THE HONORABLE J. F. MCINERNEY, M.D., Minister of Health and Social Services attended a meeting of Atlantic province ministers with the Minister of National Health and Welfare, Honorable Paul Martin on January 17. He was accompanied by Dr. J. A. Melanson, Chief Medical Officer, and Dr. A. M. Clarke, Assistant Chief Medical Officer and Director of Health Planning Services. Dr. Melanson then journeyed to Toronto for a meeting of provincial deputy ministers called by Dr. R. D. Defries, Director of the Connaught Medical Research Laboratories. The purpose of the meeting was to discuss the latest developments in the polio vaccination plans.

DR. R. S. LANGSTROTH, Director of Dental Health Services and Civil Defence Health Services for New Brunswick, attended a four day conference in civil defence at the Civil Defence College, Arnprior, Ontario, from February 14 to 18.

DR. J. R. MAYERS, Director of Maternal and Child Health, outlined further steps to be taken in the program for a reduction of infant and maternal deaths in the province, the target in this instance being hemolytic diseases of infants. The purpose of the steps to be taken is to stimulate interest in prenatal RH blood examinations. By agreement with the New Brunswick Medical Society, the

Director of Maternal and Child Health will receive copies of all RH negative blood examinations from the provincial laboratory. Then, under an arrangement with Dr. Branch, Director of the Red Cross Blood Transfusion Service, blood will be shipped to the right hospital at the proper date for the infant concerned *in case* transfusion is required.

Again Dr. Mayers is exploring the possibility of sending physicians from selected localities on a short course in hemolytic disease of the newborn to either Toronto, Montreal, Boston or New York. In addition, the health department will consider the establishment of kits of equipment at centres round the province.

DR. DAVID A. STEWART, Chief Welfare Officer, New Brunswick Department of Health and Social Services, outlined the Department's plans for an experimental welfare bureau to be established in Woodstock, N.B. Essentially, it is a scheme to increase the value to the community of existing social services. The bureau, as Dr. Stewart foresees it, would form around a nucleus of the county agent of the Childrens Aid Society, pensions inspectors for Carleton County, public health nurses and representatives of the Maternal and Child Health Division. It would work in liaison with the district medical health officer, and operate offices in the same building.

Operational efficiency of the bureau is expected to be greater than welfare by the current facilities. The anatomy of each agency will be protected within the bureau structure, Dr. Stewart emphasized.

Nova Scotia

AN INSTITUTE on "Nursing Aspects in Maternal and Infant Care", was held at the Dalhousie University, February 16, 17, and 18, sponsored by the School of Nursing. The guest speaker was Miss Aileen Hogan of Maternity Center Association. Dr. Atlee, Dr. Tupper, as well as nurses, nutritionists and mothers participated in the discussions.

Forty of the provincial public health nurses were privileged to attend this Institute. The Institute covered the four Atlantic Provinces.

EMPLOYMENT SERVICE

Advertisements regarding "positions available" and "personnel available" will be published in from one to three consecutive issues, depending upon the requirements of the agency or person concerned. They are limited to seventy words or less, with a confidential box number if desired. There is no charge for this service to members of the Association. Health agencies are charged a flat rate of \$10.00 for the advertisements (up to four consecutive issues) and for the service. The rate for non-members is \$5.00. The service includes confidential clearing of information between prospective employer and employee if desired.

Public Health Nurses required by Department of Health, City of Kingston. Salary range in effect, five day week, pension and hospitalization plans available. Apply to Medical Officer of Health, City Hall, Kingston. 3-5

Public Health Nurses required for generalized program with health unit, liberal car allowance and good personnel policies. Apply to R. S. Peat, M.D., Medical Officer of Health, Stormont, Dundas and Glengarry Health Unit, 104 Second Street West, Cornwall, Ontario.

Sanitary Inspector required for health unit. Liberal transportation arrangements and good personnel policies. For further details apply to R. S. Peat, M.D., Medical Officer of Health, Stormont, Dundas and Glengarry Health Unit, 104 Second Street West, Cornwall, Ontario.

Sanitary Inspector, qualified, required by the Department of Health, City of Kingston. Salary range in effect, transportation provided, five day week. Pension and hospitalization plans are available. Apply to Medical Officer of Health, City Hall, Kingston, Ontario. 3-4

Public Health Nurse for generalized program in Prince Edward County Health Unit. Initial salary \$2700. Annual increment of \$100. Allowance for experience. Employee benefits include: Blue Cross, Pension Plan, Sick Leave and one month vacation. Workmen's Compensation. Liberal transportation allowance. Apply to W. N. Turpel, M.D., Director, Prince Edward County Health Unit, Picton, Ontario.

Public Health Nurse required immediately for generalized program, for appointment with sub-office of the Red Deer Health Unit. Excellent starting salary plus consideration for former experience or qualifications. Yearly increments, Pension plan, Group Hospitalization benefits. New Unit car furnished while on duty. Nominal charge for completely furnished living quarters adjacent to Unit office. Direct enquiries to the Medical Officer of Health, The No. 9 (Red Deer) Health Unit, Red Deer, Alta.

Public Health Nurses for generalized program. Minimum salary \$2700, with allowance for previous experience and annual increments of \$120. Cumulative sick leave plan. Pension plan and Blue Cross plan available. Interest free loans available for purchasing cars if necessary. Liberal transportation allowance and holidays. Apply to A. E. Thoms, M.D., Director, Leeds and Grenville Health Unit, Victoria Building, Brockville, Ontario. 3-5

Dentist required to work in a rural children's preventive dental program in southern Saskatchewan. Involves some travel. Allowance for private car or government car supplied. Equipment and assistant provided. Salary to be negotiated. Apply to Children's Preventive Dental Program, Health Region No. 2, ASSINIBOIA, Saskatchewan.

District Supervisor required for City of Ottawa Health Department, preferably with certificate in Administration and Supervision in Public Health Nursing. Generalized program under Director of Public Health Nursing. Good personnel policies, Blue Cross and Pension plan available. For further details apply Employment and Labour Office, Treasury Department, Transportation Building, 48 Rideau Street, Ottawa 2, Ontario. 3-4

Assistant Director of Public Health Nursing required by City of Ottawa Health Department. Certificate in Administration and Supervision in Public Health Nursing required. Generalized program. Good personnel policies, Blue Cross and Superannuation plan available. For further details apply to Personnel Office, Transportation Building, 48 Rideau Street, Ottawa 2, Ontario. 3-4

Public Health Nurse (qualified) for City of Ottawa. Generalized program. Good salaries. Blue Cross. Superannuation. For details please apply to Personnel Officer, Labour and Registry Office, Transportation Building, 48 Rideau Street, Ottawa 2, Ontario. 3-4

Sanitary Inspector, qualified, required by the East York-Leaside Health Unit. Salary range in effect, transportation provided. Pension and hospitalization plans are available. Apply to Medical Officer of Health, East York-Leaside Health Unit, Coxwell and Mortimer Avenues, Toronto 6. 3-5

Consultant—Public Health Nutrition, required by the Department of Health, Victoria. Salary \$281 to \$339 per month. Graduate from recognized University with specialization in food and nutrition; approved post-graduate training or a certificate in public health; experience in public health nutrition, institutional dietetics or related field. Must be British Subject under 40 years (except ex-service women, given preference). Apply Chairman, British Columbia Civil Service Commission, Parliament Buildings, Victoria, B.C., not later than April 30.

Sanitary Inspector, qualified, C.S.I.(C.), experienced in full general program, desires position with either health unit or private concern. References available. Own car. Box 26, Canadian Public Health Association, 150 College Street, Toronto 5, Ontario.

